Amendments to the Specification

Page 1, beginning with line 2, amend the title as follows.

Sheet-like medium alignment apparatus including device and means locatable at different positions

From page 31, line 13 to page 42, line 12, amend the paragraphs as follows.

In an aspect of the invention ~~Claim 1~~, even if a retaining means of rotation/drive type is used, it does not interfere with the sheet-like medium loaded on the loading means at the first position. This protects the retaining means against earlier wear due to sliding contact, unlike in the case of the prior art. Further, when a retaining means which is not a rotation/drive type is used, it waits at the first position after fulfilling retaining function. This does not interfere with the step of alignment where ejected sheet-like media are moved by the gravitational action until it hits the vertical wall.

According to an aspect of the invention ~~in Claim 2~~, the retaining means is not kept in a sliding contact with the sheet-like medium on the loading means at all times. This allows a considerable reduction of temporal wear and loss.

According to an aspect of the invention ~~in Claim 3~~, the retaining member moves to the second position to perform retaining function before the leading edge of the sheet-like medium being ejected contacts the loaded sheet-like medium. Then it moves to the first position which is not in contact with the loaded sheet-like medium. This allows retaining function to be fulfilled while wear and loss due to sliding contact with the loaded sheet-like medium are reduced.

The invention ~~in Claim 4~~ ensures ejected sheet-like media to be dropped on the already stacked sheet-like media.

According to an aspect of the invention ~~in Claim 5~~, the operation of the retaining means is triggered at the time when a sensor installed at the closest position upstream from

the ejecting means has detected the leading edge downstream from the sheet-like medium. This allows the sheet-like media to be retained with the minimum time error, and prevents the loaded sheet-like media from protruding. Further, time required from the detection by the sensor to the start of the movement of the retaining means can be set to a constant set value, independently of the dimensions of the sheet-like medium, with the result that the control software can be simplified. This permits the size the control storage element to be reduced, whereby cost reduction can be achieved.

According to an aspect of the invention ~~in Claim 6~~, the aforementioned loaded sheet-like medium is retained by the retaining means until the leading edge of the ejected sheet-like media contacts the sheet-like medium loaded on the loading means to stop movement. This prevents the sheet-like medium from being pushing out, and protects alignment of the loaded sheet-like medium against possible interference.

According to an aspect of the invention ~~in Claim 7~~, the time of stopping the retaining means can be set in conformity to the change of sheet-like medium. This protects vertical alignment of the loaded sheet-like medium against possible interference.

According to an aspect of the invention ~~in Claim 8~~, protrusion of the ejected sheet-like medium is eliminated by setting the time when the retaining means stops in conformity to the change of the configuration on the upper surface of the sheet-like medium according to the number of sheet-like media loaded on the loading means. This method also protects vertical alignment of the loaded sheet-like medium against possible interference.

According to an aspect of the invention ~~in Claim 9~~, it is possible to set the time when the retaining means stops in conformity to the change in the distance from the ejecting means varying in conformity to the curled shape of the ejected sheet-like medium to the loaded sheet-like medium. Pushing out by the ejected sheet can be eliminated can be eliminated by

setting the suitable time when the retaining means stops. This method also protects vertical alignment of the loaded sheet-like medium against possible interference.

According to an aspect of the invention ~~in Claim 10~~, vertical alignment is improved by the sheet-like medium retaining function by the same retaining means and returning function, independently of the state of curling and loading.

According to an aspect of the invention ~~in Claim 11~~, a third position is provided between the first and second positions in order to ensure a waiting position between one returning operation and the next returning operation. This reduces the traveling distance and traveling time of the retaining means, thereby ensuring improved productivity.

According to an aspect of the invention ~~in Claim 12~~, the rotation of the retaining means consisting of a rotary body is stopped when the retaining function of the retaining means is carried out. This method prevents the sheet-like medium from buckling due to excessive return of the sheet-like medium to the vertical wall.

According to an aspect of the invention ~~in Claim 13~~, the retaining means can be set to a desired stop position on a periodic basis.

According to an aspect of the invention ~~in Claim 14~~, the retaining means can be displaced to a far distance. The configuration allowing free bending between the first and second members is more compact than other configurations to achieve the same stroke. This method also ~~allow~~ allows vertical displacement, for example, in plotting an angular locus, and it can be made to hit the sheet-like medium on the loading means.

According to an aspect of the invention ~~in Claim 15~~, the first member supporting the second member equipped with a retaining means can be rocked and displaced by the first rocking means.

According to an aspect of the invention ~~in Claim 16~~, a periodic displacement moving between at least two different positions can be given to the first member, hence, retaining means by the rotary motion of an eccentric cam.

According to an aspect of the invention ~~in Claim 17~~, the position of the retaining means can be adequately managed by adoption of a combination of a stepping motor and encoder.

According to an aspect of the invention ~~in Claim 18~~, a stable periodic rocking operation is given to the first member by a reliable contact between the first member and eccentric cam provided by the first contacting means consisting of an elastic means.

According to an aspect of the invention ~~in Claim 19~~, installation of a second rocking means makes it possible to change the angle of the second member with respect to the first member around the second pivot portion, whereby the returning means can be moved between desired positions along a desired locus. Further, the stroke of the returning means can be increased by a combination between the rocking operations of the first and second members.

According to an aspect of the invention ~~in Claim 20~~, contact of the second member with the flat plate cam is provided by the second contacting means. This allows the returning means to be moved in the vertical direction in conformity to the rocking of the first member, and the retaining means can be displaced along an angular locus by a combination of rocking between the first and second members. Then the sheet-like medium loaded on the loading means can be moved to the second stop position without being pushed out in the direction of ejection.

According to an aspect of the invention ~~in Claim 21~~, the second member rotates about the second pivot portion away from the flat plate cam even if the loading means has risen, thereby preventing the member from being damaged.

According to an aspect of the invention ~~in Claim 22~~, the rocking fulcrum points of the first and second members are provided with pulleys, and power is transmitted to the retaining means by these pulleys. The shaft for power transmission is also used as a rocking shaft for displacement of the returning means. This configuration ensures a simple structure of the power transmission system and allows electric power to be easily supplied from outside the first member. This ensures a light weight and compact configuration of the displacement means.

According to an aspect of the invention ~~in Claim 23~~, the function of the second contacting means is provided by a simple configuration using the mechanism for turning the retaining means, without having to install a second contacting means.

According to an aspect of the invention ~~in Claim 24~~, loading operation can be performed at an excellent state of alignment as to the direction of ejection even if back curled paper is used or the type of the sheet has been changed.

According to an aspect of the invention ~~in Claim 25~~, the trailing edge of the sheet-like medium is firmly caught by the returning means and excellent alignment is provided even if there is a variation in the direction of ejection at the trailing edge of the sheet-like medium falling on the loading means.

According to an aspect of the invention ~~in Claim 26~~, excellent alignment is ensured by complete elimination of uncertain elements by the thrust action of the sheet-like medium by the returning means.

According to an aspect of the invention ~~in Claim 27~~, a third stop position is provided between the first and second stop positions to reduce the time required to reach the second stop position and time required for retreat from the second stop position, with the result that high speed paper ejection is ensured.

According to an aspect of the invention ~~in Claim 28~~, the returning means can be set to a desired stop position on a periodic basis.

According to an aspect of the invention ~~in Claim 29~~, the retaining means can be displaced to a far distance. The configuration allowing free bending between the first and second members is more compact than other configurations to achieve the same stroke. This method also ~~allow~~ allows vertical displacement, for example, in plotting an angular locus, and it can be made to hit the sheet-like medium on the loading means.

According to an aspect of the invention ~~in Claim 30~~, the first member supporting the second member equipped with a retaining means can be rocked and displaced by the first rocking means.

According to an aspect of the invention ~~in Claim 31~~, a periodic displacement moving between at least two different positions can be given to the first member, hence, retaining means by the rotary motion of an eccentric cam.

According to an aspect of the invention ~~in Claim 32~~, the position of the retaining means can be adequately managed by adoption of a combination of a stepping motor and encoder.

According to an aspect of the invention ~~in Claim 33~~, a stable periodic rocking operation is given to the first member by a reliable contact between the first member and eccentric cam provided by the first contacting means consisting of an elastic means.

According to an aspect of the invention ~~in Claim 34~~, installation of a second rocking means makes it possible to change the angle of the second member with respect to the first member around the second pivot portion, whereby the returning means can be moved between desired positions along a desired locus. Further, the stroke of the returning means can be ensured by a combination between the rocking operations of the first and second members.

According to an aspect of the invention ~~in Claim 35~~, contact of the second member with the flat plate cam is provided by the second contacting means. This allows the returning means to be moved in the vertical direction in conformity to the rocking of the first member, and the retaining means can be displaced along an angular locus by a combination of rocking between the first and second members. Then the sheet-like medium loaded on the loading means can be moved to the second stop position without being pushed out in the direction of ejection.

According to an aspect of the invention ~~in Claim 36~~, the second member rotates about the second pivot portion away from the flat plate cam even if the loading means has risen, thereby preventing the member from being damaged.

According to an aspect of the invention ~~in Claim 37~~, the rocking fulcrum points of the first and second members are provided with pulleys, and power is transmitted to the retaining means by these pulleys. The shaft for power transmission is also used as a rocking shaft for displacement of the returning means. This configuration ensures a simple structure of the power transmission system and allows electric power to be easily supplied from outside the first member. This ensures a light weight and compact configuration of the displacement means.

According to an aspect of the invention ~~in Claim 38~~, the function of the second contacting means is provided by a simple configuration using the mechanism for turning the retaining means, without having to install a second contacting means.

According to an aspect of the invention ~~in Claim 39~~, the returning means is operated subsequent to ejection to the tray. This makes it possible to firmly catch the sheet-like media having failed to get back to the vertical wall because of changes in the inclination on the top surface of the load on the tray in conformity to the state of curling, with the result that

excellent alignment in the vertical direction is ensured, independently of the state of curling and loading of the sheet-like medium.

According to an aspect of the invention ~~in Claim 40~~, the time from the detection of the trailing edge of the sheet by an ejection sensor to the start of operation by the returning means can be set to a constant value, independently of the dimensions of the sheet-like medium, with the result that the control software can be simplified. This permits the size the control storage element to be reduced, whereby cost reduction can be achieved.

According to an aspect of the invention ~~in Claim 41~~, the set value T2 is adjusted to the time sufficient to allow the sheet to hit the end fence, thereby ensuring that the sheet can be returned to the end fence and sheet-like media can be aligned in the vertical direction.

According to an aspect of the invention ~~in Claim 42~~, time when the returning means is stopped at the second stop position can be changed in conformity to the conditions of the sheet-like medium. This permits returning roller control to be made in response to the friction of the sheet and change of the weight due to the difference in sheet-like media, and ensures sheet-like media to be aligned in the vertical direction.

According to an aspect of the invention ~~in Claim 43~~, the speed of the returning means traveling from the first stop position to the second stop position is slower than the returning speed by the returning means. As a result, when the returning means travels from the first stop position to the second stop position, it is kept in contact with the sheet-like media on the loading means. When force is applied to push the sheet-like media in the direction of ejection, the returning speed by the returning means becomes higher than the push-out speed, therefore, preventing the sheet-like medium from being pushed out in the direction of ejection. This also ensures the alignment of the sheet-like media in the vertical direction.

According to an aspect of the invention ~~in Claim 44~~, the returning means is moved to the first stop position when a paper jam has occurred. This allows the returning roller to be

retracted to the position where the amount of getting from the machine is the minimum. This avoids the possibility of damaging the returning means when a user takes step of solving the jamming problem.

According to an aspect of the invention ~~in Claim 45~~, accuracy in the alignment of the sheet-like medium in the vertical direction by the returning means is adversely affected by stopping the alignment operation if a failure has been detected in the returning means; however, sheets can be ejected without having to stop the system.

According to an aspect of the invention ~~in Claim 46~~, the drive speed when the returning roller is located at the first stop position is reduced below that when it is located at the second stop position, thereby preventing the trailing edge of the ejected sheets from being flipped and pushed out in the direction of ejection.

According to an aspect of the invention ~~in Claim 47~~, the drive speed when the returning roller is located at the first stop position is reduced below that when it is located at the second stop position, whereby sheet-like media which can be gripped by the returning roller are ejected onto the loading means, without the trailing edge of the ejected sheets being flipped or stopped.

According to an aspect of the invention ~~in Claim 48~~, the drive speed of the returning roller ~~121~~ is constant even when an apparatus equipped with the returning roller is connected to various types of image forming apparatuses having different transport speeds. This prevents the trailing edge of the ejected sheet from being flipped and the sheet from being pushed out in the direction of ejection.

According to an aspect of the invention ~~in Claim 49~~, the processing time by the aligning means, sorting means and returning means can be easily assigned by a simple means of variable control of ejection speed by the ejecting means.

According to an aspect of the invention ~~in Claim 50~~, aligning and returning operation time can be easily assigned by increasing the ejection speed.

According to an aspect of the invention ~~in Claim 51~~, it is possible to define the degree of ejection speed increase which allows aligning and returning operation time to be assigned.

According to an aspect of the invention ~~in Claim 52~~, sorting operation time can be easily assigned by decreasing the ejection speed.

According to an aspect of the invention ~~in Claim 53~~, it is possible to define the degree of ejection speed decrease which allows sorting operation time to be assigned.

According to an aspect of the invention ~~in Claim 54~~, sorting operation time can be assigned by omitting the aligning operation.

According to an aspect of the invention ~~in Claim 55~~, the speed is adjusted to an appropriate level when sheet-like media are ejected from the ejecting means, whereby excellent stacking is provided.

According to an aspect of the invention ~~in Claim 56~~, sheet-like media subsequent to image formation can be aligned to a high precision, and sheet aligning, sorting and returning functions are provided.

According to an aspect of the invention ~~in Claim 57~~, sheet-like media can be aligned to a high precision in a sheet-like medium post-treatment apparatus having a post-treatment function subsequent to image formation and sheet aligning, sorting and returning functions are provided.

According to an aspect of the invention ~~in Claim 58~~, sheet-like media can be stacked separately at different positions on the tray.

According to an aspect of the invention ~~in Claims 59 to 65~~, the sheet-like media of different sizes can be sorted according to size and stacked on the tray.

According to an aspect of the invention ~~in Claims 66 to 69~~, proper alignment of sheet-like media is possible.

According to an aspect of the invention ~~in Claims 70 to 72~~, the top surface of the tray or sheet-like medium loaded on the upper surface of the tray can be set at a proper position.

According to an aspect of the invention ~~in Claims 73 to 78~~, proper alignment of sheet-like media is possible.

According to an aspect of the invention ~~in Claims 79 to 80~~, easy alignment of the end faces of sheet-like media is possible.

According to an aspect of the invention ~~in Claims 81 to 83~~, sheet-like media subsequent to image formation can be aligned to a high precision.

According to an aspect of the invention ~~in Claims 84 to 89~~, proper alignment of sheet-like media is possible.

Page 47, beginning with line 3, amend the paragraph as follows.

The present embodiment represents an example of a variable retaining means which is separated from the loaded paper at the wait position. ~~It corresponds mainly to Claims 1 to 4 and 13.~~

Page 68, beginning with line 19, amend the paragraph as follows.

The present embodiment represents an example of application of a sheet-like medium post-treatment apparatus~~, and corresponds mainly to Claim 26~~. The following describes the case where a sheet-like medium alignment apparatus equipped with a displacement means having a configuration described with reference to the aforementioned FIGS. 4 to 16 is mounted on the sheet-like medium post-treatment apparatus:

Page 83, beginning with line 6, amend the paragraph as follows.

The present embodiment represents an example of control in a displacement means~~, and corresponds mainly to Claims 5 to 12~~.

Page 85, beginning with line 4, amend the paragraph as follows.

~~The present embodiment corresponds mainly to Claims 5 and 6.~~ When the shift mode for sorting sheets is selected in a sheet-like medium post-treatment apparatus 51, sheets transported from the image forming apparatus 50 are received by a pair of inlet roller 1 shown in FIG. 17. After passing through a pair of transport roller 2a and a pair of transport rollers 2b, they are ejected onto the tray 12 by the ejection roller 3 as a final transporting means. At that time, branching jaws 8a and 8b stay at the default position, and sheets are ejected onto the tray 12 after passing through the similar transport route one by one.

Page 90, beginning with line 25, amend the paragraph as follows.

~~This Example corresponds to Claim 7.~~ In this Example, the timer set value T2 shown in FIG. 27 in the aforementioned Example 1 is made variable in conformity to the dimensions of the sheets ejected from the ejection roller 3. The control in this Example is performed according to the flow charts shown in the FIG. 25, and FIGS. 26 and 28.

Page 92, beginning with line 10, amend the paragraph as follows.

~~This Example corresponds to Claim 8.~~ In this Example, the timer set value T2 given in FIG. 27 in the aforementioned Example 1 can be changed in conformity to the number of the sheet-like media ejected from the aforementioned ejecting means. In this Example, control is made according to the flow chart given in the aforementioned FIGS. 25, 26 and 29. FIGS. 25 and 26 will not be described since they have already been described. FIG. 29 is partly the same as the aforementioned FIG. 27. The same step numerals as those of FIG. 27 will be used for the same portions without duplicated description, and only the differences will be described.

Page 93, beginning with line 23, amend the paragraph as follows.

~~This Example corresponds to Claim 9.~~ In this Example, the timer set value T2 given in FIG. 27 in the aforementioned Example 1 can be changed in conformity to the number of

the sheet-like media ejected from the aforementioned ejecting means. In this Example, control is made according to the flow chart given in the aforementioned FIGS. 25, 26 and 30. FIGS. 25 and 26 will not be described since they have already been described. FIG. 30 is partly the same as the aforementioned FIG. 27. The same step numerals as those of FIG. 27 will be used for the same portions without duplicated description, and only the differences will be described.

Page 95, beginning with line 12, amend the paragraph as follows.

~~This Example relates to control according to Claim 10.~~ In this Example, after having used the retaining function at the second position (I), the retaining roller 121 moves to the first position (I) or a third position (III) intermediate between the first position (II) and second position (II) away from the loaded sheets, and waits there. When fulfilling the retaining function, it moves to the second position (II) after the first sheet ejected from the ejection roller 3 has fallen on the tray 12. Then it performs the returning function of returning the aforementioned first sheet to the end fence 131.

Page 99, beginning with line 19, amend the paragraph as follows.

~~This Example corresponds to Claim 11.~~ In this Example, control is made in such a way that the retaining roller 121 is allowed to move also to a third position (III) intermediate between the first position (II) and second position (II) away from the loaded sheets, and to wait there. This method of control is intended to reduce the time for traveling to the second position.

Page 104, beginning with line 21, amend the paragraph as follows.

~~This Example is an example of control related to Claim 12.~~ When the retaining roller is assumed to be rotating in the direction of returning at all times in this Example, control is made in such a way that rotation is stopped when the second position has been reached to fulfill retaining function.

Page 106, beginning with line 14, amend the paragraph as follows.

This embodiment represents an example of application to an image sheeting apparatus. ~~It mainly corresponds to Claim 56.~~

Page 109, beginning with line 27, amend the paragraph as follows.

This embodiment represents an example where the position of the returning means (returning roller) is made variable. ~~It mainly corresponds to Claims 24 to 27.~~

Page 116, beginning with line 2, amend the paragraph as follows.

This embodiment represents an example of a displacement means~~, and mainly corresponds to Claims 28 to 38~~.

Page 117, beginning with line 23, amend the paragraph as follows.

~~This Example corresponds to Claims 39, 40 and 41.~~ When a shift mode for sorting the sheets is selected in the sheet-like medium post-treatment apparatus 51 given in FIG. 17, the sheets transported from the image forming apparatus 50 are received by a pair of inlet roller 1 in FIG. 17 as described above. They are then ejected onto the tray 12 through a pair of transport roller 2a and a pair of transport roller 2b by an ejection roller 3 as a final transport means. In this case, branching jaws 8a and 8b remain at the default position, and sheets are ejected onto the tray 12 one after another through the same transport route.

Page 123, beginning with line 23, amend the paragraph as follows.

This Example ~~corresponds to Claim 42. It~~ is a variation of the aforementioned Example 1. In the present Example, control is made in such a way that the set value T2 in step P27 given in FIG. 41 is changed according to the conditions such as the quality and size of paper, number of stacked sheets or a combination thereof.

Page 127, beginning with line 12, amend the paragraph as follows.

~~This Example corresponds to Claim 43.~~ The flow chart given in FIG. 46 according to the present Example corresponds to the one where steps PP31 and PP32 are added between

the steps P22 and P23 in the flow chart of FIG. 41. Other steps are the same as those is FIG. 41. So the same steps are assigned with the same numerals of reference. Only the differences from FIG. 41 will be described below:

Page 128, beginning with line 22, amend the paragraph as follows.

~~This Example corresponds to Claims 44 and 45.~~ FIG. 47 indicates the initial operation to be performed immediately after the power of sheet-like medium post-treatment apparatus 51 has been turned on, and the main route which is always passed through upon termination of initial operation. Basic configuration is the same as that of the aforementioned FIG. 39, the difference being that sub-routines of step P4 of "jam treatment control" and step P5 of "operation failure control" are added after step P3.

Page 137, beginning with line 10, amend the paragraph as follows.

~~This example corresponds to Claims 46, 47, 48.~~ In control by the control means in the second embodiment, the drive speed of the returning roller is controlled in such a way that the drive speed at the first stop position is slower than the drive speed (reference speed) at the second stop position.